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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/542,076	07/13/2005	Kai Eck	DE030024US1	8935
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EXAMINER				
ZEILBERGER, DANIEL				
ART UNIT		PAPER NUMBER		
2624				
MAIL DATE		DELIVERY MODE		
07/16/2009		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/542,076

Applicant(s)

ECK, KAI

Examiner

DANIEL ZEILBERGER

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-5,9,12,18 and 21-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9,12 and 25-31 is/are allowed.
- 6) ☒ Claim(s) 1,3,5,18 and 21-24 is/are rejected.
- 7) ☒ Claim(s) 4 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 31 2009 has been entered.

Claim Objections

2. Claim 1 is objected to because of the following informalities: there appears to be a space missing between the words "image" and "of" at line 9 of the claim, wherein it is recited "imageof". Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. *Claims 5, 21 and 23* are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding **claim 5**, the clams lacks proper antecedent basis for claimed "the reconstructed diagnostic image" at line 4 of the claim, rendering it unclear what "the

reconstructed diagnostic image" is. However, for the purposes of examination "the reconstructed diagnostic image" will be interpreted as --the diagnostic image--.

Regarding **claim 21**, the claim lacks proper antecedent basis for claimed "the reconstructed diagnostic image" at line 2 of the claim, rendering it unclear what "the reconstructed diagnostic image" is. However, for the purposes of examination "the reconstructed diagnostic image" will be interpreted as --the diagnostic image--.

Regarding **claim 23**, the claim lacks proper antecedent basis for claimed "the reconstructed diagnostic image" at line 5 of the claim, rendering it unclear what "the reconstructed diagnostic image" is. However, for the purposes of examination "the reconstructed diagnostic image" will be interpreted as --the diagnostic image--.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. *Claims 1, 3, 18, 22 and 24* are rejected under 35 U.S.C. 103(a) as being unpatentable over Seeley et al. (US Patent 6,484,049) hereinafter referenced as Seeley.

Regarding **claim 1**, Seeley discloses a method of determining the position of a patient in a diagnostic image (see column 16 lines 3-6), the patient being located on an examination table in an imaging region (see figure 1), the method comprising:

providing a pattern of marking elements indicative of the position of the patient (see column 9 lines 18-25, wherein an array or markers is provided);

generating a diagnostic image of the patient including the marking elements (see column 7 lines 19-30 and column 11 lines 44-47 and lines 61-63), the marking elements being configured such that in the diagnostic image, the marking elements are concealed in noise such that the pattern as a whole is detectable from a correlation between the diagnostic image and a filter image of the pattern and such that each element is not individually detectable by a computer system and by a human viewer of the diagnostic image (see column 12 lines 14-58, wherein not all markers will be located in the image, wherein in order to determine the pattern as a whole a correlation procedure is performed);

extracting the pattern from the generated diagnostic image by the correlation of the diagnostic image to the filter image (see column 12 lines 14-58, wherein in order to determine the pattern as a whole a correlation procedure is performed).

In addition, while the embodiment of Seeley discussed above fails to disclose claimed "attaching the pattern of marking elements to at least one of the patient that is being imaged and the examination table", the examiner maintains that it would have been obvious, in view of an alternative embodiment, to provide:

attaching the pattern of marking elements to at least one of the patient that is being imaged and the examination table (see column 18 lines 46-66, wherein it is disclosed that affixing the marker array to the support table addresses the issue of the limited flexibility in positioning the image detector near the patient).

Therefore, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Seeley, by specifically providing "attaching the pattern of marking elements to at least one of the patient that is being imaged and the examination table", for the purpose of increasing flexibility in position the image detector near the patient.

Regarding **claim 3**, Seeley further discloses:

wherein the filter image of the pattern is transformed relative to the actual pattern of the marking elements (see column 12 lines 21-33, wherein Seeley discloses that that one suitable protocol takes a candidate marker P_i in image coordinates, assumes it is marker number Q_j of sheet one, and then determines how many other candidate markers support this match, i.e. line up with the expected projections of the remaining markers of one array).

Regarding **claim 18**, Seeley further discloses:

forming the pattern of marking elements with a combination of a size, a shape, and a material that renders the marking elements not visibly evident individually in the image to a machine viewer (see column 12, lines 14-17).

Regarding **claim 22**, Seeley further discloses wherein the step of obtaining the diagnostic image includes:

projecting an x-ray beam through the patient and the pattern of marking elements (see x-ray source 22 in figure 1 and column 7 lines 10-55);

receiving the x-ray beam with an x-ray detector that has a plurality of individual sensors of the x-ray detector of a common size (see imaging assembly 24 in figure 1 and column 7 lines 10-55, column 8 lines 43-64);

reconstructing an output of the x-ray detector into the diagnostic image (see figure 1 and column 7 lines 10-55);

wherein each marking element approximately covers an area of one of the sensors of the x-ray detector (see column 12 lines 21-33, wherein each marking element has a corresponding image coordinate).

Regarding **claim 24**, Seeley further discloses:

wherein the marking elements are carried on an x-ray transparent carrier (see column 10 lines 48-65 and column 11 lines 1-22, wherein the sheet is flexible in that it can move in position, and further is flexible in that any material has at least some degree of flexibility) and further including:

attaching the x-ray transparent carrier to the patient (see column 11 lines 1-22, wherein one set of tracking elements is attached to the patient); and

monitoring movement of the patient from changes in the pattern extracted from the diagnostic images as the patient moves (see column 11 lines 1-22).

7. *Claim 5* is rejected under 35 U.S.C. 103(a) as being unpatentable over Seeley in view of Erbel et al. (US Patent Application 2002/0122530), hereinafter referenced as Erbel.

Regarding **claim 5**, Seeley discloses everything as applied above in regards to claim 1. However, Seeley fails to disclose "wherein the position of at least one further object is determined in the diagnostic image, wherein a second pattern of marking elements, which do not show up individually in the reconstructed diagnostic image, is attached to the further object, and wherein the second pattern is different from the first pattern". However, the examiner maintains that it would have been obvious, in view of Erbel, to provide:

wherein the position of at least one further object is determined in the diagnostic image, wherein a second pattern of marking elements, which do not show up individually in the reconstructed diagnostic image, is attached to the further object, and wherein the second pattern is different from the first pattern (see Erbel figure 4 and paragraph 32, wherein Erbel discloses a computer tomography, wherein a calibration phantom 5 comprises inner marking rods and outer point markers 5 arranged on its bed 6, as disclosed in paragraph 32 and exhibited in figure 4, and further see figure 5 and paragraph 33, wherein Erbel further discloses patient marking having the reference numeral 7).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Seeley, by specifically providing "wherein the position of at least one further object is determined in the diagnostic image, wherein a second pattern of marking elements, which do not show up individually in the reconstructed diagnostic image, is attached to the further object, and wherein the second pattern is different from the first pattern", as taught by Erbel, for the purpose of detecting the position of both the bed and the patient so that the patient can be positioned correctly on the bed, while the patient markings are not recorded in the image thus not degrading image quality.

8. *Claims 21 and 23* are rejected under 35 U.S.C. 103(a) as being unpatentable over Seeley in view of Simon et al. (US Patent 6,118,845), hereinafter referenced as Simon.

Regarding **claim 21**, Seeley discloses everything as applied above in regards to claim 1. Seeley fails to disclose the limitations of claim 21. However, the Examiner maintains that it would have been obvious, in view of Simon, to provide:

wherein the marking elements appear in the reconstructed diagnostic image as a watermark which is invisible in diagnostic image diagnostic evaluation and does not distort or impair the diagnostic evaluation of the diagnostic image (see Simon column 7 lines 20-34, wherein Simon discloses that once the offset of a particular image has been determined, processor 303 proceeds with eliminating the artifacts by identifying the calibration marker projections, and, for each identified projection, subtracting the

acquired offsets from the pixels of the projection, wherein ideally steps 901-904 will completely eliminate the artifacts from the image while leaving the true underlying image).

Therefore the Examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Seeley, by specifically providing "wherein the marking elements appear in the reconstructed diagnostic image as a watermark which is invisible in diagnostic image diagnostic evaluation and does not distort or impair the diagnostic evaluation of the diagnostic image", as taught by Simon, for the purpose of when the imaged marks 20' prove disturbing in the 2D projections, the imaged marks can subsequently be calculated out of the 2D projections in an image processing step.

Regarding **claim 23**, Seeley discloses everything as applied above in regards to claim 22. Seeley fails to disclose the limitations of claim 23. However, the Examiner maintains that it would have been obvious, in view of Simon, to provide:

using precalculated radiation absorption of the marking elements to correct degradation of the reconstructed diagnostic image attributable to the marking elements (see Simon column 7 lines 20-34, wherein Simon discloses that once the offset of a particular image has been determined, processor 303 proceeds with eliminating the artifacts by identifying the calibration marker projections, and, for each identified projection, subtracting the acquired offsets from the pixels of the projection, wherein

ideally steps 901-904 will completely eliminate the artifacts from the image while leaving the true underlying image).

Therefore the Examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Seeley, by specifically providing "using precalculated radiation absorption of the marking elements to correct degradation of the reconstructed diagnostic image attributable to the marking elements", as taught by Simon, for the purpose of when the imaged marks 20' prove disturbing in the 2D projections, the imaged marks can subsequently be calculated out of the 2D projections in an image processing step.

Allowable Subject Matter

9. *Claim 4* is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
10. *Claims 9, 12 and 25-31* are allowed.

Regarding **claim 4**, the claim recites the limitation of "wherein the diagnostic image is generated by means of radioscopy, and the marking elements exhibit a low absorption of the X-rays, the effect of which lies within the noise level of the X-ray image". The cited prior art fails to provide for marking elements that are within the noise level of the X-ray image, such that, as recited in claim 1, the pattern of the marking elements can still be detected. Thus the Examiner believes that the cited prior art fails to

either anticipate or obviate claim 4. Accordingly, claim 4 would be allowable if rewritten in independent form to include all of the limitations of claim 1.

Regarding **claim 9**, similarly to claim 4, the claim provides for both the marking elements to have a low enough absorption of the X-rays that the effect of the marking elements on the X-ray image is within the noise level, while at the same time being capable of detecting the marking element pattern in the X-ray image. As discussed in regards to claim 4, this combination of features is not found in the prior art. **Claims 12 and 25-29**, depending from claim 9 thus contain all of the features of claim 9, and are found to be allowable for the same reasoning.

Regarding claim 30, similarly to claims 4 and 9, the claim provides for both the marking elements to have a low enough absorption of the X-rays that the effect of the marking elements on the X-ray image is within the noise level, while at the same time being capable of detecting the marking element pattern in the X-ray image. As discussed in regards to claim 4, this combination of features is not found in the prior art. **Claim 31**, depending from claim 30 thus contain all of the features of claim 30, and is found to be allowable for the same reasoning.

Response to Arguments

11. Applicant's arguments filed March 31 2009 in regards to claims 1, 3, 5, 18 and 21-24 have been fully considered but they are not persuasive.

Applicant argues that "With reference to claim 1, it is submitted that when claim 1 is interpreted as requiring the marking elements to be individually not visibly evident or

individually not detectable, then the claim is being properly interpreted and is supported by the specification. In Seeley, the individual marking elements are detectable or visible to a computer system or a human viewer. Simon is not cited as and does not cure this shortcoming of Seeley. Accordingly, it is submitted that claim 1 and claims 3-5, 18, and 21-24 dependent therefrom distinguish patentably and unobviously over the references of record." The Examiner respectfully disagrees. Specifically, Seeley discloses at column 12 lines 14-58 that not all markers will be located in the image, wherein in order to determine the pattern as a whole a correlation procedure is performed. Thus, a correlation procedure is needed in order to determine the positions of the marking elements. Stated in other words, in Seeley, a given marking element cannot be confirmed to be a marking element without performing a correlation of the entire marking pattern. The Examiner maintains that this reads on the limitation in contention.

As to Applicant's other arguments, the arguments are moot as the rejections are no longer applicable.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL ZEILBERGER whose telephone number is (571)270-3570. The examiner can normally be reached on M-F 8:30-6pm est (alternate Fridays off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on (571)272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Daniel Zeilberger
Examiner
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07/11/09

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